TO FIND OUT THE EFFECTS OF SCAPULAR TAPING ON PAIN REDUCTION BY USING VISUAL ANALOGUE SCALE (VAS) IN SHOULDER IMPINGEMENT SYNDROME

By

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PADMAVATH COLLEGE OF PHYSIOTHERAPY

PERIYANAHALLI

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Under the guidance of

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Submitted in Partial fulfillment of the requirements for the

Degree of **Master of Physiotherapy**

From

The Tamilnadu Dr. M.G.R. Medical University,

Chennai

PADMAVATH COLLEGE OF PHYSIOTHERAPY

PERIYANAHALLI

DHARMAPURI

CERTIFICATE

This is to certify that the project entitled **"TO FIND OUT THE EFFECTS OF SCAPULAR TAPING ON PAIN REDUCTION BY USING VISUAL ANALOGUE SCALE (VAS) IN SHOULDER IMPINGEMENT SYNDROME"**

Submitted by the candidate

(Reg. No . 27101806)

is a bonafide work done in partial fulfillment of the requirements for the Degree of **Master of Physiotherapy** from

The Tamilnadu Dr. M.G.R. Medical University,

Chennai

Guide **Principal**

Viva-voce Examination held on _____

Internal Examiner **External Examiner**

DECLARATION

I hereby declare and present my dissertation entitled **"TO FIND OUT THE EFFECTS OF SCAPULAR TAPING ON PAIN REDUCTION BY USING VISUAL ANALOGUE SCALE (VAS) IN SHOULDER IMPINGEMENT SYNDROME"** the outcome of the original research work undertaken and carried out be me , under the guidance of **Mr. J. RAVI SHANKAR, M.P.T. , MIAP.,** Associate Professor , Padmavathi College of Physiotherapy, Periyanahalli, Dharmapuri , Tamilnadu.

I also declare that the material of this dissertation had not formed in any basis for the award of any other Degree previously from the Tamilnadu Dr. M.G.R. Medical University, Chennai.

(VINOD. M.R)

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(VINOD. M.R)

DEDICATED TO MY BELOVED

PARENTS , STAFFS

AND

LOVABLE FRIENDS

TABLE OF CONTENTS

INTRODUCTION

Shoulder joint is one of the most functional and rewarding joint necessary for normal daily activities, occupational performance and recreational activities. (Cyriax, 1978). This joint is later termed as shoulder complex because a series of articulations are necessary to position the Humerus in space.

Its function comprises between stability and mobility, which are mutually co existent. It forms base of all upper limb activities. The mobility of the shoulder depends upon the proximal stability of humerus and scapula. The design of shoulder girdle allows for mobility of upper limb extremities, which combine with tendon and muscle to allow a wide range of motion to the arm that is from scratching your back to throwing the perfect pitch.

Neer in 1982 first credited with describing the impingement sign as mechanical Impingement of Supraspinatus and the long head of biceps underneath the acromial arch. This condition is classified as a primary Impingement syndrome. Pain is felt during the abduction range of 80-120 degrees. Approximately 7% - 23% of the population suffers from

impingement syndrome (Chard.el.al.). Scapulo thoracic muscle weakness and relative decrease in the subacromial space due to functional scapulo thoracic instability would be the underlying mechanism for the cause of secondary Impingement syndrome (Kamker.et.alk., 1998 and Kibler, 1998).

The annual incidences of impingement syndrome are 3 in every fifty persons. Mobility has its price however it may lead to increasing problems with instability or impingement of soft tissue resulting in pain. Report prevalence that of 15% - 25% in patients with 30-40 years of age having shoulder pain. In industry the prevalence of symptoms and disorders from shoulder region is about 30% - 40% and has increased six times during last decade.

Shoulder pain in commonly caused by impingement of the acromial, coracoclavicular ligament, and acromioclavicular joint over the underlying structures. The impingement is caused by the inflammation of any of the underlying structures. Shoulder pain is measured be using the Visual analogue scale (VAS).

The application of taping (Mc Connell) is widely used by physical therapist in the rehabilitation and prevention of shoulder injuries (Engstrome & Renstrom, 1999, Robins & Waked, 1998). The purpose of these techniques is to normalize, the scapulo humeral rhythm, provide a low-lo ad, prolonged duration stretch, promotes proximal scapular stability, reduces the pain and corrects the abnormal scapular position. Recently various taping techniques of scapula have been introduced into the conservative management of shoulder girdle (Host, 1995, Nottraml, 1977, Hall, 1999, Schmitle & Synder, 1999).

AIM OF THE STUDY

The aim of the study to find out the effects of scapular taping on pain reduction by using Visual Analogue Scale (VAS) in shoulder impingement syndrome.

OBJECTIVES

To determine the improvement brought about by scapular taping with Visual Analogue Scale (VAS) in shoulder impingement syndrome.

HYPOTHESIS

The null hypothesis states that there is no significant effect of scapular taping on shoulder impingement pain syndrome.

The alternate hypothesis states that there is significant effect of scapular taping on shoulder impingement pain syndrome.

REVIEWS OF LITERATURE

REVIEWS ON TAPING

Kim Young – Ju (2001)

The purpose of the study was to decrease or remove the pain and to improve the abduction range and effect of tapes on the muscles related to painful abduction in shoulder impingement syndrome for supra spinatus, infra spinatus, Teresminor, Serratus anterior, Levator scapulae. The 10 cases of shoulder impingement syndrome were selected as samples and treatment has given from April 1, 1998 to August 30, 1998. ROM of abduction for shoulder joint was measured before after taping. The result showed that the painful limitation of shoulder joint was improved in all ten subjects by 150%.

Clar.D., et.al., (University of Sydney, 2000)

Conducted a randomized control trail on 40 subjects aged around 30-50 years to measure the Visual Analogue Scale pain responses with shoulder impingement syndrome for the period of 2 months. The subjects were divided into 3 groups as (a) Non taped with strengthening exercises, (b) Taped with strengthening exercises, and (c) Taped without

strengthening exercises. The purpose of the study was evaluating the most effective treatment for shoulder impingement syndrome. The subjects were rated the pain with Visual Analogue Scale. The result of the study showed that there was a significant reduction of pain for the subjects who received taping along with shoulder strengthening exercise programme. (Australian Journal of Physiotherapy)

Adams.J.M., et.al.,

Conducted a study on 10 participants diagnosed with impingement syndrome and 10 without a history of shoulder pathology. The purpose of the study was to analyze the effect of scapular taping on 6 muscles, the upper and lower trapezius, middle deltoid, Supraspinatus, Infraspinatus and lower Seratusanterior. Subjects were performed flexion; abduction and scaption in taped and non taped under 3 weighted conditions. The result of the study showed that following taping a significant increase in infraspinatus activity and significant decrease in middle deltoid were found and also suggested that mechanism other than an over active upper trapezius contribute to impingement.

Moseley.J.B, (1992)

The purpose of the study was to determine the effect of exercises on shoulder rehabilitation program. The study was conducted on 15 male subjects with shoulder impingement syndrome for a period of 4 months. EMG analysis of 8 muscles was studied. The optimal exercises for each muscle were identified based on intensity (greater than 50% maximal manual muscle test) and duration (over at least 3 consecutive arcs of motion) of the muscle activity. The study revealed that a group of 4 exercises were shown to make up the most effective in reducing pain during the scapular muscle-strengthening programme. (PMID: 1558238, Pub. Med – Index of Midline)

Cools.A.M., et.al., (2002)

Conducted an experiment on 20 individuals with shoulder impingement syndrome. The purpose of the study was to examine the influence of one particular tape on muscular activity in scapular muscles. The surface EMG recordings on three parts of trapezius and Serratus anterior muscles during dynamic full range of abduction and forward flexion were studied. The result of the investigation revealed that there was a significant influence of tape application on EMG activity in scapular muscles. (Manual therapy, Vol. &(3), 2002. Pp: 154-162)

REVIEWS ON VAS PAIN SCALE

Joanna Krueger (1995)

Conducted an experimental study on 15 male subjects, age between 30-45 years with a diagnosis of right shoulder pain over period of 8 months. The purpose of the experiments to study the benefit of using scapular taping in conjunction with a Home Exercise Program (HEP) for the treatment of anterior shoulder impingement. On VAS scale, the samples rated 0/10 when at rest and 5/10 with end range of shoulder flexion and abduction. The study revealed that there is a significant effect on shoulder impingement syndrome with scapular taping, which resulted in patient's ability to perform full Gleno humeral flexion and abduction without pain. (Host.HH Physical therapy, 1995; 75/9, 803-811).

Scrimshaw.S.V., et.al., (2001)

Conducted an experimental study was to compare the responsiveness of the Mc Gill pain questionnaires with Visual Analogue Scale (VAS). 35 patients with anterior shoulder pain who had participated in a randomized controlled trail of rehabilitation were included in the study. All patients completed both as VAS and Mc Gill pain scale to describe their pain over the last 24 hours and separate Visual

Analogue Scale to determine their current pain. The result of the study suggested that Visual Analogue Scale (VAS) might be better tool than the Mc Gill pain questionnaire for measuring pain in clinical trail and clinical practice.

Michael Lee, (1996)

Conducted an experiment study on 15 patients, age around 40-50 years who have anterior shoulder pain with shoulder impingement syndrome. The purpose of the study was to find the effect of taping and pain reduction. The result of the study showed that there was significant reduction of the pain following scapular taping by about 50% during the activities. (m.lee@cchs.usyd.edu.au: 28 Jan, 1997)

MATERIALS & METHODOLOGY

MATERIALS

- Couch
- Cotton
- Pillow
- Adhesive Tape
- Scissor
- Surgical Spirit
- Visual Analogue Scale (VAS)

RESEARCH DESIGN

Experimental study design – Pre Vs Post.

RESEARCH SETTING

This study has been conducted in Exercise therapy Department of JKKMMRF College of Physiotherapy – PG Studies under the supervision of concerned authority.

RESEARCH SAMPLE

The total 20 subjects diagnosed as shoulder impingement pain syndrome were selected by using purposive random sampling method with due consideration of inclusion and exclusion criteria.

INCLUSION CRITERIA

Patients with shoulder impingement pain syndrome

- Only Males
- Age: 50-60 years
- Stage: Sub acute

EXCLUSION CRITERIA

- Any fracture around shoulder
- Dislocation shoulder
- Shoulder hand syndrome
- Fibrositis
- Degenerative arthritis
- Infective arthritis
- Metastatic tumor
- Cervical spondylosis
- Pain coast tumor

- Associated Cardio-Vascular problems
- Known diabetes and hypertension
- Nutritional factors

PARAMETER

Visual Analogue Scale (VAS)

Visual Analogue Scale (VAS) was used to measure the severity of pain response that the patients experience immediately during the abduction and forward flexion of the shoulder. It consists of 10 cm horizontal line with two ends labeled as no pain 0 and severe pain 10. The patients marked a pint on the line, which corresponded to the severity of pain that the patients experiences.

PROCEDURE

20 male subjects were involved in this study, which are suitable for the inclusion criteria, were examined by a medical officer. After the informed consent was obtained they were taken as one group for the study.

Pre and Post data's were collected before and after giving taping with the help of Visual Analogue Scale (VAS).

TECHNIQUE

The total 20 male subjects were selected randomly according to the inclusion criteria. Mc Connell taping technique has been applied to the scapula. Pain was assed by using Visual Analogue Scale (VAS) during the active range of abduction of shoulder.

Mc Connell Taping Technique

Mc Connell tape has been applied to the supra spinatus, infra spinatus, teresminor and subscapularis muscles along its action line of forces, from superior angle of the medial border of the scapula to the greater tubercle of the humerus for supra spinatus, from the medial border of the scapula to the greater tubercle for infra spinatus and from the lateral border of the scapula to the greater tubercle of the humerus for teresminor.

The passive force created by the pull of the rotator cuff muscle will decrease the over activity of the deltoid muscle pull on humerus head and produces external rotation of the humerus during elevation of arm which results in the reduction of impingement. The tape has been applied for the duration of 14-16 hours per day for 2 months and should be removed during nighttime.

FIGURE I : Mc CONNELL TAPE WITH ACCESSORIES

FIGURE II : Mc CONNEL'S TAPING TECHNIQUE

1. Taping of Supra spinatus from superior angle of the medial border of the scapula to the greater tubercle of the humerus.

2. Taping of Infra spinatus from medial border of the scapula to the greater tubercle of the humerus.

STATISTICAL TOOLS

The paired t-test was used to compare Pre Vs Post test results of VAS pain response.

Formula: Paired t-test

$$S = \sqrt{\frac{\sum d^2 - \frac{(\sum d)^2}{n}}{n-1}}$$

$$t = \frac{\bar{d}\ \sqrt{n}}{S}$$

d = Difference between the Pre Test Vs Post Test

$\bar{d}$ = Mean difference

n = Total number of subjects

S = Standard deviation

DATA PRESENTATION

TABLE – I

S.No.	Visual Analogue Scale (VAS) Pain Response (in centimeters)	
	Pre Test	Post Test
1	7	4
2	6	4
3	8	2
4	5	3
5	8	2
6	6	5
7	8	3
8	7	3
9	6	5
10	8	1
11	5	2
12	6	2
13	7	5
14	9	3
15	8	4
16	7	6

17	9	2
18	6	1
19	5	4
20	7	

DATA ANALYSIS & INTERPRETATION

TABLE – II

The comparative mean values, mean difference, standard deviation and paired t-test value between Pre Vs Post test values of Visual Analogue Scale (VAS) pain responses.

S. No.	Visual Analogue Scale (VAS) pain response (Centimeters)	Improvement			Paired t-vale
		Mean	Mean Difference	Standard Deviation	
1	Pre Test	6.9	3.8	0.77	19.09
2	Post Test	3.1			

Table II showed the analysis of Visual Analogue Scale (VAS) pain response. The Pre test of VAS was 6.9 and Post test of VAS was 3.1. The mean difference of VAS between Pre and Post test results was 3.8, which

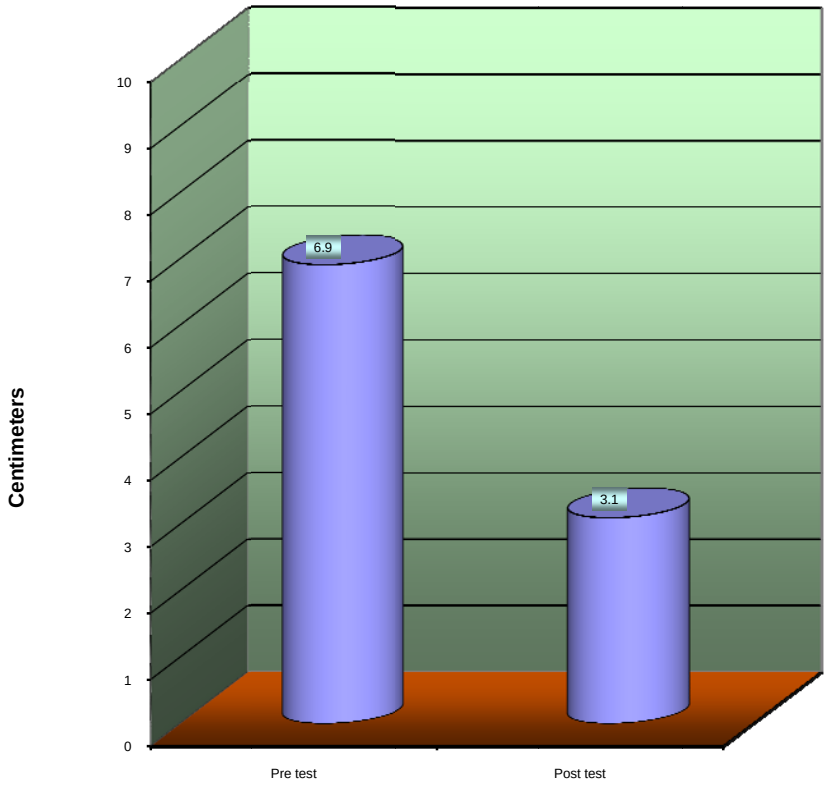
showed that there was a significant reduction of pain in response to scapular taping.

The paired t-value 19.09 was greater than the tabulated t-value 2.093 at 0.05% level of significance, which showed that there was significantly reduction of pain between Pre Vs Post test values.

Therefore the study was rejecting the null hypothesis and accepting the alternate hypothesis.

Graph I : Visual Analogue Scale (VAS) Pain Response

Pre Test Vs Post Test



DISCUSSION

The purpose of the study was to find out the effect of scapular taping on pain reduction in shoulder impingement syndrome.

Scrimshaw.S.V., et.al., (2001) conducted an experimental study was to compare the responsiveness of the Mc Gill pain questionnaires with Visual Analogue Scale (VAS). 35 patients with anterior shoulder pain who had participated in a randamized-controlled trail of rehabilitation were included in the study. All patients completed both as VAS and Mc Gill pain scale to describe their pain over the last 24 hours and separate Visual Analogue Scale to determine their current pain. The result of the study suggested that Visual Analogue Scale (VAS) might be better tool than the Mc Gill pain questionnaire for measuring pain in clinical trail and clinical practice.

Based on the above study results, Visual Analogue Scale (VAS) is a useful tool to measure the pain intensity, which enables the researcher to take it as one of the parameter.

Joanna Kruuegar (1995) conducted an experimental study on 15 male subjects, age between 30-45 years with a diagnosis of right shoulder pain over period of 8 months. The purpose of the experiments to study the benefit of using scapular taping in conjunction with a Home Exercise Programme (HEP) for the treatment of anterior shoulder impingement. On VAS scale, the samples rated 0/10 when at rest and 5/10 with end range of shoulder flexion and abduction. The study revealed that there is a significant effect on shoulder impingement syndrome with scapular taping, which resulted in patient's ability to perform full Gleno humeral flexion and abduction without pain. (Host.HH Physical therapy, 1995; 75/9, 803-811).

Based on the above study results, the present study has been taken that the Mc Connell taping for supra spinatus, Infra spinatus and teres minor are effective in reducing the pain in shoulder impingement syndrome.

In the present study,

The analysis and interpretation of pain showed that there was a significant difference between Pre Vs Post test result. The Pre test value was 6.9 cm, Post test value was 3.1 cm, and the mean difference was 3.8.

The paired t-value is 19.09, which is more than the tabulated t-value 2.093 at 0.05% level of significance, which indicate that there was a significant reduction of pain in response to the Mc Connell scapular taping of supra spinatus which was supported by the study results of Kim Joung – Ju.

Kim Joung – Ju (2001) conducted an experimental study to decrease or remove the pain and to improve the abduction range and effect of tapes on the muscles related to painful abduction in shoulder impingement syndrome for supra spinatus, infra spinatus, Teresminor, Serratus anterior, and Levator scapulae. The 10 cases of shoulder impingement syndrome were selected as samples and treatment has given from April 1, 1998 to August 30, 1998. ROM of abduction for shoulder joint was measured before after taping. The result showed that the painful limitation of shoulder joint was improved in all ten subjects by 150%.

The possible mechanism for pain reduction due to three main areas namely,

1. The reposition of the scapula by Mc Connell's corrective taping.
2. The effect on the afferent nervous system, and
3. Placebo effect.

The purpose of taping is to provide mechanical support and limit the abnormal or excessive movement, while providing support to the structures that the injury has compromised. The repositioning of the scapula will take off the pressure on the impinged structures, provide a low-load, prolonged duration stretch and promotes proximal scapular stability.

Bockrath, et.al. (1993) and Gifford (1995) believed that taping provided a strong inhibitory stimulus through large afferent fibres at the dorsal horn of the spinal cord to block the small diameter nociceptor input through a pain gate type mechanism.

Taping may increase mechanical pain threshold by generating hypoalgesia due to the stimulation of the periaqueduct grey area of the medulla by inhibiting descending noradrenergic system at the dorsal horn (Wright, 1995; Wilson, 1995)

Gifford (1995) regarded placebo as a positive finding especially when dealing chronic pain states. Even if this is the only effect, it can influence nervous activity at the dorsal horn through the descending pain suppression system.

SUMMARY AND CONCLUSION

Shoulder impingement syndrome is one of the most common overuse injuries with high demands on shoulder movements. The impingement of the supraspinatus and long head of biceps cause it over the acromial arch.

The aim of the study was to find out the effects of scapular taping of supraspinatus, infraspinatus, and teresminor muscles with Visual Analogue Scale (VAS) as a parameter. A total number of twenty male patients with an age of 30-50 years were selected by purpose random sampling method after due consideration of the inclusion and exclusion criteria.

The patients were given treatment with Mc Connel taping of supraspinatus, infraspinatus, and teresminor muscles, for 14 to 16 hours per day upto two months. Before and after the interventions, VAS for pain were recorded and analyzed to compare the pre Vs post test results by using paired t-test.

The statistical analysis revealed that there was a significant reduction of pain after the treatment. Hence the null hypothesis was rejected and alternate hypothesis was accepted.

Based on the result the study concluded that the Mc Connel scapular taping technique was effective in pain reduction in shoulder impingement syndrome.

RECOMMENDATION

1) Further research will be necessary to examine other parameters of neuromuscular control in order to determine possible proprioceptive changes in muscle recruitment with tape application.

2) Further study can be conducted to include joint mobilization techniques were operated after taping all the time, as a possible application for shoulder rehabilitation programme.

3) Further studies can be conducted by using Mc Connell taping technique in conjunction with shoulder strengthening exercise programme for shoulder instability conditions

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APPENDICES

Informed Consent of Subjects

a. Name :

b. Age :

c. Sex :

d. Occupation :

e. Nationality :

f. Address for Communication :

g. Height (in Mts) :

h. Weight (in Kgs) :

i. BROCA's Index :